SECTION 16120

WIRES AND CABLES (600 Volt)

PART 1 - GENERAL

1.1 SUMMARY

A. Extent of electrical wire and cable work is indicated by drawings and schedules. Wires and cables shall be single, insulated conductors, field-installed in continuous raceways unless specified otherwise.

B. Types of electrical wire, cable and connectors specified in this section include the following:

1. Copper conductors.
2. Tap type connectors.
3. Wirenut connectors.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products of one (1) of the following (for each type of wire, cable and connector):

1. Wire and Cable:

a. Apex Wire and Cable Corp.
b. American Insulated Wire Corp.
c. American Wire and Cable Co.
d. Belden Div; Cooper Industries.
e. Brand-Rex Div; Pyle National Co.
f. Cerro Wire and Cable Corp.
g. Cleveland Insulated Wire Co.
h. General Cable Corporation.
i. Helix Wire Corporation.
j. Houston Wire
k. Indiana Insulated Wire Inc.
l. Laribee Wire Manufacturing Co., Inc.
m. Madison Wire and Cable Corp.
n. Okonite Co.
o. Pirelli Cable Corp.
p. Radix Wire Co.
q. Rome Cable Corp.
r. Southwire Company.
s. Triangle PWC, Inc.

2. Connectors:

a. AMP, Inc.
b. Appleton Electric Co; Emerson Electric Co.
c. Buchanan Co.
d. Burndy Corporation.

e. Brand-Rex Div. Pyle National Co.
f. Electrical Products Div; Midland-Ross Corp.
g. General Electric Co.
h. Gould, Inc.
i. Ideal Industries, Inc.
j. Leviton Mfg Company.
k. 3M Company
l. O-Z/Gedney Co.
m. Southport Industries Inc.
n. Square D Company.
o. Thomas and Betts Corp.

2.2 WIRES, CABLES AND CONNECTORS

A. General: All reference to size in these specifications or on drawings is for copper conductors. Provide electrical wires, cables and connectors of manufacturer's standard materials, as indicated by published product information; designed and constructed as recommended by manufacturer, for a complete installation and for application indicated. Except as otherwise indicated, provide copper conductors with conductivity of not less than 98% at 20°C (68°F).

B. Building Wires: Provide factory-fabricated wires of sizes, ampacity rating, and materials for applications and services indicated. Where not indicated, provide proper wire selection as determined by Installer to comply with project's installation requirements, NEC and NEMA Standards.

C. Cables: Provide UL-type factory-fabricated cables of sizes, ampacity ratings, and materials and jacketing/sheathing as indicated for services indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements, NEC and NEMA Standards.

D. Connectors: Provide UL-type factory-fabricated, metal connectors of sizes, ampacity ratings, materials, types and classes for applications and for services indicated. Where not indicated, provide proper selection as determined by Installer to comply with project's installation requirements, NEC and NEMA Standards.

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRES AND CABLES

A. General: Install electrical cables, wires and wiring connectors as indicated, in compliance with applicable requirements of NEC, NEMA, UL and NECA's "Standard of Installation" and in accordance with recognized industry practices.

B. The normal minimum size shall be 12 AWG. All wire No. 10 and smaller to be solid, all No. 8 and larger shall be stranded.

C. All service entrance, feeder and branch circuit wiring shall be type THHN/THWN.

D. Pull conductors simultaneously where more than one (1) is being installed in same raceway.

E. Use pulling compound or lubricant, where necessary; compound used must not deteriorate conductor or insulation. Use of soap will not be permitted as pulling lubricant.

F. Insulation on conductors shall be permanently marked with wire size, insulation type, voltage range and manufacturer's name. The insulation on conductors shall be color coded as follows to match existing. If non-exists the following shall apply:

1. 120/208-volt circuit: Phase A - Black; Phase B - Red; Phase C - Blue.
2. 277/480-volt circuit: Phase A - Brown; Phase B - Orange; Phase C - Yellow.

G. The phase conductors shall be tagged and shall remain the same throughout the circuit.

H. Exceptions to the color coding as listed above shall be as follows:

1. Wiring for special systems shall be color coded or labeled as required by the manufacturer.

2. On a 4-wire, delta connected secondary where the midpoint of one (1) phase is grounded, the phase conductor having the higher voltage to ground shall be Phase B and shall be color coded orange.

I. Use pulling means including, fish tape, cable, rope and basket weave wire/cable grips which will not damage cables or raceway.

J. Install exposed cable, parallel and perpendicular to surfaces, or exposed structural members and follow surface contours, where possible.

K. Keep conductor splices to minimum.

L. Install splices and taps which possess equivalent-or-better mechanical strength and insulation ratings than conductors being spliced.

M. Use splice and tap connectors which are compatible with conductor material.

N. All splices and taps shall be made in outlet, junction and pull boxes. Splices on circuit wiring shall be of the pigtail type using solderless connectors. Larger sizes of conductors requiring uninsulated connectors of the bolt type shall be taped with pressure sensitive vinyl tape.

O. For branch circuit wiring, conductor fill per conduit run shall not contain more than eight (8) current carrying wires, provided the wire size is derated as required by the National Electrical Code. Conduits containing both circuit switch legs and/or traveler wires may contain more than the number stated above, providing the conduit is of adequate size and the wire size is derated as required by the National Electrical Code. Whenever a 120-volt, single phase branch circuit is over 70-feet in length or a 277-volt, single phase branch circuit is over 150-feet, and the load is in excess of 50% of the branch circuit protective device, the conductors shall be increased one (1) size to the first outlet box unless specifically noted otherwise. For special systems conductor fill of conduit is per manufacturers specifications furnished with each system, noted on the drawings or shall be as required by code.

P. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standard 486A and B.

3.2 FIELD QUALITY CONTROL

A. Prior to energization of circuitry, check installed wires and cables with megohm meter to determine insulation resistance levels to ensure requirements are fulfilled.

B. Prior to energization, test wires and cables for electrical continuity and for short-circuits.

C. Subsequent to wire and cable hook-ups, energize circuitry and demonstrate functioning in accordance with requirements. Where necessary, correct malfunctioning units and then retest to demonstrate compliance.

END OF SECTION